



Vocabulary

Review

- Underline the correct word to complete the sentence.

If two triangles are *congruent*, corresponding angle measures are the same/
different and corresponding side lengths are the same/ different.

- A *transformation* is a change in form or appearance.
Which picture does not show a transformation of the soccer ball?



A.



B.



C.



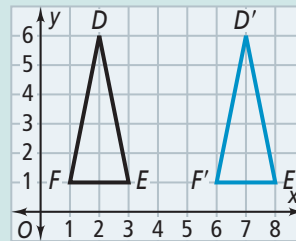
Vocabulary Builder

translation (noun) truh anz lay shuh n

Related Words: transformation, slide, preimage, image

Main Idea: A **translation** describes how a figure in a coordinate plane is slid from one place to another.

Example: Each point in $\triangle DEF$ was moved 5 units to the right. $\triangle D'E'F'$ is a **translation** of $\triangle DEF$.



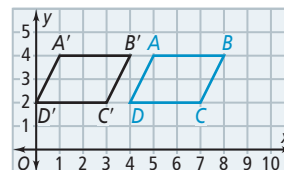
Use Your Vocabulary

- Tell whether the pair of figures shows a translation. Write *yes* or *no*.



- In what direction is the translation of figure $ABCD$?

- How many units has figure $ABCD$ been translated?



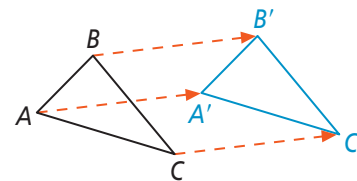
Key Concept Translation

A **translation** is a transformation that maps all points of a figure the same distance in the same direction.

You write the translation that maps $\triangle ABC$ onto $\triangle A'B'C'$ as $T(\triangle ABC) = \triangle A'B'C'$. A translation is a **rigid motion** with the following properties:

If $T(\triangle ABC) = \triangle A'B'C'$, then

- $AA' = BB' = CC'$
- $AB = A'B', BC = B'C', AC = A'C'$
- $m\angle A = m\angle A', m\angle B = m\angle B', m\angle C = m\angle C'$



Circle the correct word in each statement.

- Translations move **some / all** points in a figure the same distance, in the same direction.
- Translations **change / preserve** side lengths of the figure.
- Translations **change / preserve** angle measures of the figure.

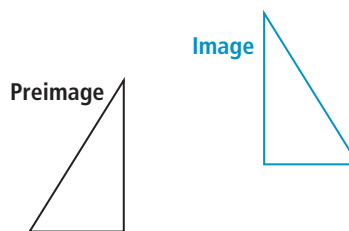


Problem 1 Identifying a Rigid Motion

Transformation A



Transformation B



Got It? Does the transformation appear to be a rigid motion?

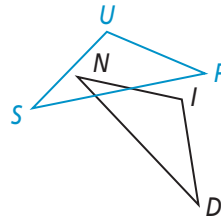
- Compare the corresponding sides of the preimage and image. Are they equal in length?
Transformation A: **yes no** Transformation B: **yes no**
- Compare the corresponding angles of the preimage and image. Are they equal in measure?
Transformation A: **yes no** Transformation B: **yes no**
- A rigid motion preserves side lengths and angles measures of the preimage.
Transformation A: **is / is not** a rigid motion.
Transformation A: **is / is not** a rigid motion.



Problem 2 Naming Images and Corresponding Parts

In the diagram, $\triangle NID \rightarrow \triangle SUP$.

Got It? What are the images of $\angle I$ and point D ?
What are the pairs of corresponding sides?



13. Use the position of the letters in the transformation statement $\triangle NID \rightarrow \triangle SUP$.

a. Angle I is in the 2nd position in $\triangle NID$. The angle in the 2nd position for $\triangle SUP$ is \angle .

b. Point D is in the 3rd position in $\triangle NID$. The point in the 3rd position for $\triangle SUP$ is point .

14. Name the three pairs of corresponding sides using $\triangle NID \rightarrow \triangle SUP$.

\overline{NI} and \overline{ID} and \overline{ND} and



Problem 3 Finding the Image of a Translation

Got It? What are the images of the vertices of $T_{\langle 1, -4 \rangle}(\triangle ABC)$?
Graph the image of $\triangle ABC$.

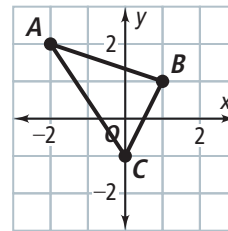
15. Identify the coordinates of the vertices of $\triangle ABC$.

$A(\text{ }, \text{ })$ $B(\text{ }, \text{ })$ $C(\text{ }, \text{ })$

16. Describe the translation rule, $T_{\langle 1, -4 \rangle}$.

Add to each x -value.

Subtract from each y -value.



17. Use the rule to find the coordinates of the vertices of the image.

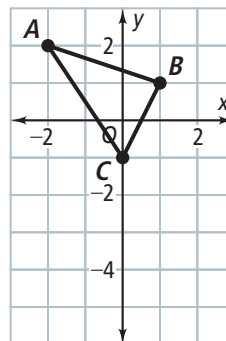
$T_{\langle 1, -4 \rangle}(A) = (\text{ } + 1, \text{ } - 4)$, or $A'(\text{ }, \text{ })$.

$T_{\langle 1, -4 \rangle}(B) = (\text{ } + 1, \text{ } - 4)$, or $B'(\text{ }, \text{ })$.

$T_{\langle 1, -4 \rangle}(C) = (\text{ } + 1, \text{ } - 4)$, or $C'(\text{ }, \text{ })$.

18. Plot the points A' , B' , and C' .

Connect the points to form $\triangle A'B'C'$.





Problem 4 Writing a Rule to Describe a Translation

Got It? The translation image of $\triangle LMN$ is $\triangle L'M'N'$ with $L'(1, -2)$, $M'(3, -4)$, and $N'(6, -2)$. What is a rule that describes the translation?

19. Choose a pair of corresponding vertices.

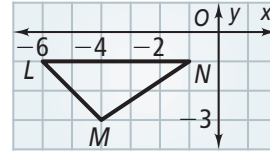
$$L(\quad, \quad) \quad L'(1, -2)$$

20. Find the horizontal change and the vertical change.

$$1 - (\quad) = \quad \rightarrow x + 7$$

$$-2 - (\quad) = \quad \rightarrow y - 1$$

21. The translation maps (x, y) to (\quad, \quad) . The translation rule is $T_{\langle \quad, \quad \rangle}(LMN)$.



Lesson Check • Do you UNDERSTAND?

Error Analysis Your friend says the transformation $\triangle ABC \rightarrow \triangle PQR$ is a translation. Explain and correct her error.

22. Identify the corresponding vertices in the statement $\triangle ABC \rightarrow \triangle PQR$.

A and

B and

C and

23. Identify the corresponding vertices from the diagram.

A and

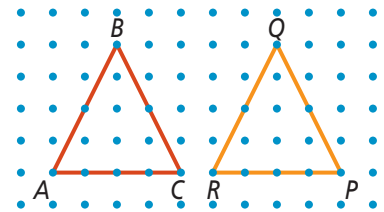
B and

C and

24. What was your friend's error? Explain.

25. Write the correct transformation statement.

$$\triangle ABC \rightarrow \triangle \quad$$



Math Success

Check off the vocabulary words that you understand.

☐ rigid motion

☐ preimage

☐ image

☐ translation

Rate how well you can use the properties of reflections.

